

## FOLDING CHAIR

### FIELD OF THE INVENTION

The present invention relates to folding chairs and, more particularly, to  
5 folding chairs having a novel hinge-joint surface configuration that forms a  
substantially rigid structure approximating conventional non-folding chair designs.

### BACKGROUND OF THE INVENTION

Folding chairs of a variety of configurations are known in the art. Indeed, an  
10 intended advantage of folding chairs is that, in a folded state, they may be shipped  
or stored more conveniently than non-folding or fully assembled chairs.

Conventional folding chairs generally include a backrest frame having legs that  
extend at downward angles to become the front legs of the chair, back legs pivotally  
mounted to the back rest frame, and a seat frame pivoted to the backrest frame, and  
15 the back legs. In addition, the prior art is replete with a wide variety of hinge and  
joint configurations to support and guide the folding members.

While the folding chairs of the prior art fulfill their respective objectives, the  
folding chair configurations of the prior art often sacrifice stability and durability  
relative to traditional, non-folding chairs, to achieve their respective functions.  
20 Accordingly, a need exists in the art for a folding chair that erects into a stable form  
approximating traditional, non-folding chairs. Embodiments of the present  
invention substantially fulfill this need.

### SUMMARY OF THE INVENTION

25 The present invention provides a folding chair having a novel hinge and joint  
surface configuration that forms a substantially rigid structure approximating  
conventional non-folding chair designs. In one embodiment, the present invention  
provides a folding chair comprising a seat frame, a backrest frame hinged  
proximally to the rear edge of the seat frame and forwardly collapsible over the

upper surface of the seat frame, and back legs hinged to the rear edge of the seat frame and forwardly collapsible over the lower surface of the seat frame. The chair, in one embodiment, further comprises front legs hinged to the seat frame and collapsible over the back legs. In an assembled state, the back legs and the backrest  
5 frame each abut against elements of the chair at joint surfaces, which limit the range of motion of the hinged members to thereby create a chair having a rigid support structure. In one embodiment, the seat frame, backrest frame, and back legs unfold into an interlocked configuration enhancing the stability of the chair.

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## DESCRIPTION OF THE DRAWINGS

Figure 1A is a perspective view of a folding chair according to a first embodiment of the present invention.

Figure 1B is a perspective view of the first embodiment of the present invention in an assembled configuration.

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Figure 1C is a perspective view of another embodiment of the present invention showing an alternate seat surface for use in the folding chair.

Figure 2A is a sectional plan view illustrating the hinges associated with the first embodiment of the present invention, and showing the folding chair in an assembled state.

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Figure 2B is a sectional plan view of the first embodiment of the present invention in a folded configuration.

Figure 3A is a sectional plan view illustrating the hinge and joint surface configuration associated with the first embodiment of the present invention.

25 Figure 3B is a sectional plan view illustrating the hinge and joint surface configuration corresponding to a second embodiment of the present invention.

Figure 3C is a sectional plan view showing the hinge and joint surface configuration associated with a third embodiment of the present invention.

Figure 3D is a sectional plan view setting forth the hinge and joint surface configuration of a fourth embodiment of the present invention.

Figure 4A is perspective sectional view showing a hinge mounted to the inner surface of the seat frame.

Figure 4B is an exploded perspective view showing an embedded hinge configuration for use in embodiments of the present invention.

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#### DESCRIPTION OF PREFERRED EMBODIMENT(S)

Figure 1A sets forth a folding chair according to a first embodiment of the present invention. As Figure 1A shows, folding chair 10 generally comprises seat frame 20, backrest frame 30, back legs 32, and front legs 25. As the various Figures 10 illustrate, backrest frame 30, in one embodiment, comprises upper and lower cross members attached to opposing lateral uprights. As described more fully below, laterally opposing hinges, such as hinges 55, join seat frame 20, backrest frame 30 and back legs 32 to create a folding assembly. Hinges 52 pivotally attach front legs 25 to seat frame 20 as shown in the various figures. Cross bar 34, in one 15 embodiment, attaches back legs 32 to add stability to chair 10 and allow back legs 32 to move as a unit. Cross bar 27 similarly attaches front legs 25 to add stability to chair 10 and allow front legs 25 to move as a unit.

In one embodiment, seat cover 40 includes pocket flaps 41 and 42 that engage the ends outer ends of seat frame 20 and backrest frame 30 (as shown in Figure 1B) 20 to provide a seat surface. As Figure 1C provides, however, backrest frame 30 and seat frame 20 may include slats 42 instead of seat cover 40. Of course, a variety of other configurations can be employed, such as the use of springs traversing the frames and a seat cushion disposed over the springs (not shown).

Figures 2A and 3A illustrate a hinge configuration according to one 25 embodiment of the present invention. Specifically, hinges 50 pivotally attach backrest frame 30 and back legs 32 to seat frame 20 as shown. In one embodiment, hinges 50 are fixed to opposing inside surfaces of seat frame 20 in a conventional manner with screws (see, e.g., Figure 2A and 3A). However, hinges 50 may be mounted to opposing outside surfaces of seat frame 20. As Figure 4B shows, hinges

50 may also be embedded within opposing lateral sides of seat frame 20. In one embodiment, screws pivotally secure back rest frame 30 to hinge 50. In one embodiment, the screws are conventional screws having a threadless shank region that engages a corresponding hole in hinge 50 and allows backrest frame 30 to smoothly pivot about the flat shank region of the screw (see Figure 4B). Back legs 32 are pivotally attached to hinge 50 in the same manner. In addition, hinge 50 can be flat (as shown in Figure 2A) or can be bent to attach to the rear crossing member of seat frame 20 (see Figure 4A). Still further, as Figure 4A provides, back legs 32 may include tongues 96, which engage corresponding grooves 97 in backrest frame 30. As one skilled in the art will recognize, similar features can be incorporated into other embodiments discussed below.

In a first embodiment, hinges 50 pivotally attach backrest frame 30 proximally to the rear edge of seat frame 20. As Figure 2B shows, backrest frame is forwardly collapsible over the upper surface of seat frame 20. In an assembled state, however, backrest frame 30 abuts against the upper surface of seat frame 20 at a joint surface and extends upwardly as shown. The joint surfaces of the backrest frame 30, in one embodiment, are located on the lower respective ends of each opposing lateral upright. In addition, hinge 50 pivotally attaches back legs 32 to the rear edge of seat frame 20 at opposing sides thereof. Similar to backrest frame 30, back legs 32 are forwardly collapsible over the lower surface of seat frame 20 (see Figure 2B). When folding chair 10 is assembled, the joint surfaces of back legs 32 abut against the rear surface of seat frame 20 and the rear surface of backrest frame 30 to interlock seat frame 20, backrest frame 30 and back legs 32 (see Figure 3A). As Figure 2B shows, hinges 52 pivotally attach front legs 25 to seat frame 20. Front legs 25 abut against the lower surface of seat frame 20 when chair 10 is assembled, and fold rearwards over back legs 32 when chair 10 is in a folded configuration.

As the various Figures illustrate, the novel hinge and joint surface configuration of the present invention has application in a wide array of

embodiments. As Figure 3B provides, Y-shaped hinge 53 pivotally attaches back legs 32 such that the joint surfaces of back legs 32 abut against the rear edge of seat frame 20 when chair 10 is assembled. Y-shaped hinge 53 also pivotally attaches backrest frame 30. When chair 10 is assembled backrest frame 30 abuts against the upper surface of back legs 32 to interlock seat frame 20, backrest frame 30 and back legs 32. As one skilled in the art will recognize, the order in which backrest frame 30 and back legs 32 are unfolded depend on how such members interlock.

Figure 3C illustrates an alternative embodiment where Y-shaped hinge 54 pivotally attaches backrest frame 30 such that it abuts against the rear edge of seat frame 20 when chair 10 is assembled. As Figure 3C shows, back legs 32 abut against the rear surface of backrest frame 30 to interlock seat frame 20, backrest frame 30 and back legs 32.

Figure 3D provides yet another embodiment of the present invention featuring a two-piece hinge structure. As Figure 3D shows, hinge 56 pivotally attaches backrest frame 30 proximally to the rear edge of seat frame 20. As above, backrest frame 30 is forwardly collapsible over the upper surface of seat frame 20. Backrest frame 30 abuts against seat frame 20 at joint surface 31 and extends at an upward angle relative to seat frame 20 when chair 10 is assembled. In addition, hinge 57 pivotally attaches back legs 32 to the rear edge of seat frame 20. As Figure 3D illustrates, when chair 10 is assembled, back legs 32 abut against seat frame 20 at joint surface 33 and extend at a downward angle relative to seat frame 20.

Figure 4B illustrates an alternate placement for the hinges; that is, Figure 4B shows hinge 50 embedded in and fixed to seat frame 20. Similarly, hinge 50 extends into groove 36 of back rest frame 30 and is pivotally attached thereto by screw 61. In one embodiment, unthreaded surface 63 engages hole 99 of hinge 50 when screw 61 is screwed into backrest frame 30. In addition, hinge 50 extends into groove 37 of back leg 32 and is pivotally attached thereto in a similar manner.

Lastly, although the present invention has been described with reference to specific embodiments, various other embodiments are possible without departing from the scope of the present invention. Other embodiments of the present invention will be apparent to one of ordinary skill in the art. It is, therefore,  
5 intended that the claims set forth below not be limited to the embodiments described above.